

Interactive comment on “A reassessment of the discrepancies in the annual variation of $\delta\text{D-H}_2\text{O}$ in the tropical lower stratosphere between the MIPAS and ACE-FTS satellite data sets” by Stefan Lossow et al.

Anonymous Referee #2

Received and published: 9 October 2019

This is an excellent study that shows that the discrepancy between MIPAS and ACE-FTS measurements of the delta-D tape recorder can be explained by the effect of seasonal changes in the lower altitude where MIPAS retrievals are possible. The apparent discrepancy in the delta-D between the two measurements was quite large, and improving our understanding delta-D can help to clarify the contribution of convectively lofted ice to stratospheric water vapor. The study highlights the importance of fully understanding and characterizing the various factors that can affect a satellite retrieval, and shows that such a recharacterization can fundamentally alter the physical

C1

interpretation of the results.

The last sentence of the Abstract does somewhat oversimplify the result. The authors do not show that “MIPAS confirms a delta-D tape recorder signal with an amplitude of about 25 per mille in the lowermost stratosphere.” What the authors show (Figure 14) is that when the EMAC simulation (which itself shows a delta-D amplitude of 25 per mille, consistent with the ACE-FTS measurements) is convolved with the MIPAS averaging kernels, then the convolved EMAC simulation gives a result consistent with the MIPAS measurement. A more appropriate phrasing of this entire sentence would therefore be “Considering these MIPAS characteristics largely removes any discrepancies between the MIPAS and ACE-FTS data sets and shows that the MIPAS data is consistent with a delta-D tape recorder signal with an amplitude of about 25 per mille in the lowermost stratosphere.”

Figure 7 – I understand that it’s easier to see the lines separately with the pressure scale going up, but I really would recommend plotting this with high pressure at the bottom just to avoid confusion.

Page 9 line 22 – “Overall, the test yields both improvements and deteriorations of the comparison results,” This is a very awkward phrase. “Overall, the test shows that in some cases agreement improves while in others it becomes worse, ...” might be better.

Page 12 line 20 - the resolution mismatch is only a “residual effect”. I’m not sure what “residual effect” means. I would drop this sentence.

Page 14 line 7 = “Both is” should be “Both are”

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-309, 2019.

C2